FIG. 1A

START

100

receiving a video sequence for image quality evaluation;

110

providing an objective metric image quality controller comprising a random set of metrics ranging from M_1 to M_n without cross correlation information;

120

applying said each one metric of said set of metrics individually to said video sequence so that said each one metric of said random set of metrics provides an individual objective scoring value of said video sequence ranging from x_1 to x_n

130

determining a plurality of sets of weights (w_1 to w_n) which correlate to predetermined subjective evaluations of image quality for a predetermined plurality of video sequences (n)

140

weighting by said each one set of weights each individual objective scoring value x_1 to x_n

150

adding the weighted individual objective scoring values of said random set of metrics into a single objective evaluation F, wherein each weighted individual scoring value from step (140) is multiplied by each individual objective scoring value x_1 to x_n from step (120);

160

calculating a correlation factor R to provide a correlation value for the objective evaluation F and the plurality of video sequences (n);

FIG. 1B

170

repeating steps (140), (150) and (160) for each set of weights provided in step (130) to determine a plurality of correlation factors R;

180

ranking said plurality of correlation factors R, wherein a particular correlation factor of said plurality of correlation factors having a particular correlation value closest to 1 represents a best ranking of the respective combined metrics in step (140) for each set of weights;

190

providing image quality information to at least one of a system optimizer and the video processing module as to the best ranking of the respective combined metrics obtained in step (i) to provide a best perceptual image quality

FIG. 1C

When a predetermined number of sets of metrics=n, the quadratic model to obtain the objective evaluation F is:

$F = (\sum_{i=1}^{n} w_i x_i)^2$, wherein " n " is a non-zero value.

FIG. 1D

when a number of the set of metrics =4, then the quadratic model to obtain the objective evaluation F is:

$F = w1x1^2 + w2x2^2 + w3x3^2 + w4x4^2 + w5x1x2 + w6x1x3 + w7x1x4 + w8x2x3 + w9x2x4 + w10x3x4.$

FIG. 1E

190

selecting a best set of weights from the plurality of sets of weights provided in step (130), said best set of weights being heuristically determined by a genetic algorithm that increases dynamically a size of the assigned range of said each one set of weights provided in step (130).

FIG. 1F

200

selecting a best set of weights from the plurality of sets of weights provided in step (130), said best set of weights being heuristically determined by a genetic algorithm that enables finding the best solution that maximizes the correlation factor R of the overall objective image quality F with the subjective evaluation without the need to carry out an exhaustive search to find the best set of weights.

FIG. 2

Calculating of the correlation factor R in step (160) by using a Spearman rank order comprising the following equation:

$$R=1-\frac{6*(X-Y)^{t}(X-Y)}{k(k^{2}-1)},$$

wherein X is equal to a vector of ranked *k* objective values for the *k* sequences (*k* * l), and

Y is equal to a vector of ranked *k* subjective evaluation for the *k* sequences (*k* * 1).

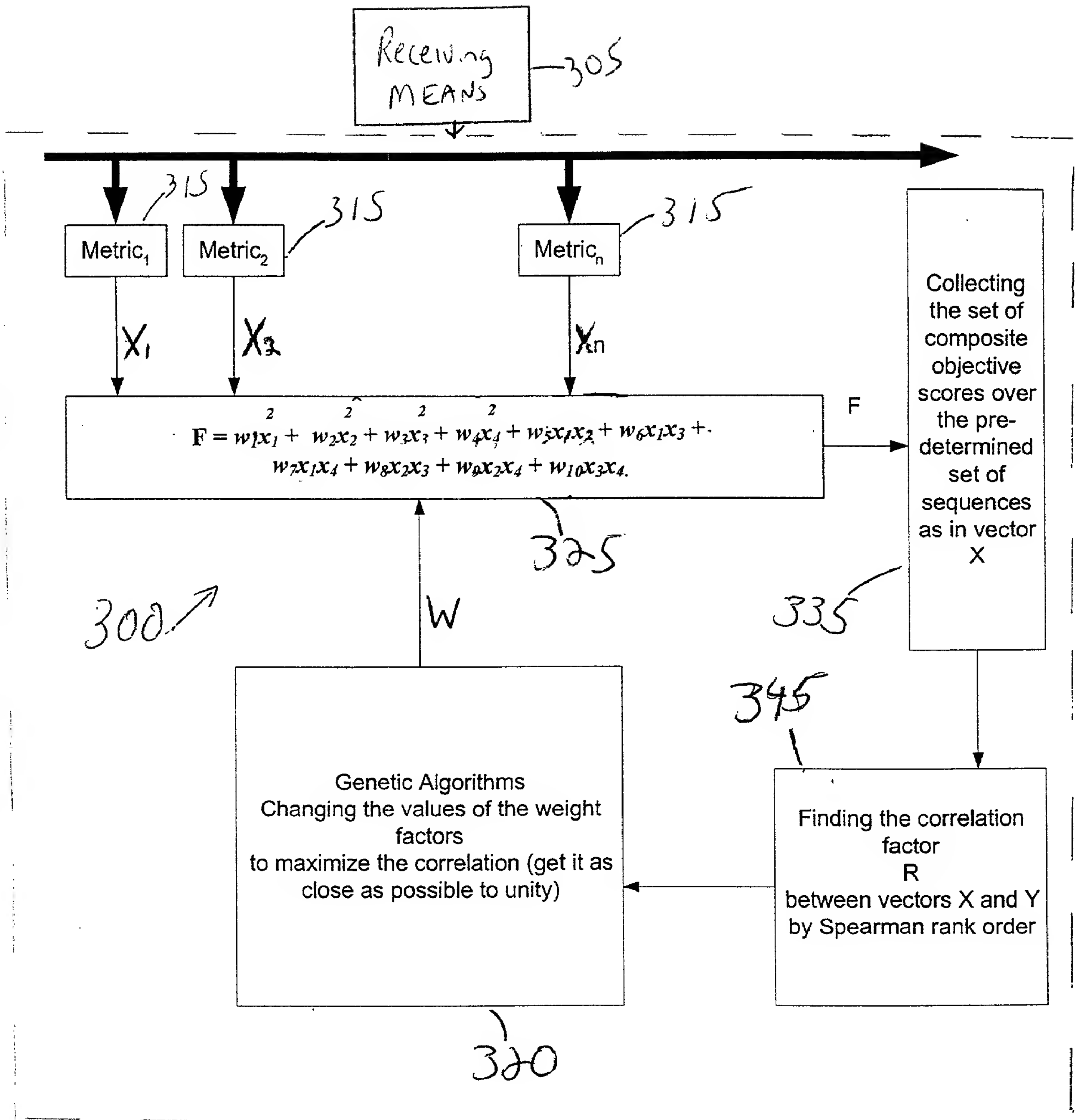
Receiving MEANS
305
315
Metric$_1$
Metric$_2$
Metric$_n$
X_1
X_2
X_n
$F = w_1x_1^2 + w_2x_2^2 + w_3x_3^2 + w_4x_4^2 + w_5x_1x_2 + w_6x_1x_3 + w_7x_1x_4 + w_8x_2x_3 + w_9x_2x_4 + w_{10}x_3x_4.$
F
Collecting the set of composite objective scores over the pre-determined set of sequences as in vector X
325
335
300
W
345
Genetic Algorithms
Changing the values of the weight factors
to maximize the correlation (get it as close as possible to unity)
Finding the correlation factor
R
between vectors X and Y
by Spearman rank order
320

Fig. 3